

Facilities Quarterly

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY ♦ FACILITIES DIVISION NEWSLETTER

JANUARY
2003

SMART 'DOZER CARVES NEW ROAD



Ghilotti engineer Rich Faria carries GPS surveying gear. Vertical poles on the bulldozer blade are GPS antennas. (Photo by Robert Couto)

Berkeley Lab's 6.5 mile road system will soon be longer by about a quarter mile. Snaking its way up Strawberry Canyon's steep slope, above Building 85, the Calvin Road Extension will provide access to a new emergency water storage tank as part of the Sitewide Water Distribution Upgrade project.

Constructing a road on slopes as rugged as Strawberry Canyon's is tricky, usually requiring a full-time surveying crew to periodically reset survey stakes and check grades against design drawings. But Berkeley Lab's subcontractor on the Sitewide Water Project, Ghilotti Bros, Inc, is avoiding this error-prone, time-consuming process with a new surveying technology, called SiteVision. SiteVision uses Global Positioning System (GPS) satellites to provide precise, real-time surveying data directly to the equipment operator via a cab-mounted monitor.

The monitor displays the bulldozer's location on a "digital terrain model" (DTM). The DTM is a topographical map of the project that includes the roadway, benches, slopes, v-ditches, and so on—all the information needed to tell the operator what to build and where to build it. The DTM also maps hidden man-made features such as existing culverts, underground utilities and road hazards. An alarm sounds when the bulldozer approaches these "avoidance zones."

According to Ghilotti project engineer Rich Faria, SiteVision "...saves huge dollars. There's no need to periodically stop work so that surveying can be done, and problems with drawings become immediately obvious." Using a backpack version of the GPS sur-

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COPING WITH THE "COST FACTOR"

According to the authoritative "Means Construction Cost Data" the cost of construction in Berkeley, including labor and materials, generally runs about 18 percent above the national average, depending on the type of work. Such a "Bay Area cost factor" is built into all Facilities estimates, making for stark comparisons with other national laboratories, whose costs are often below the national average.

In addition to high cost, Berkeley Lab suffers from a shortage of bidders. Many smaller, non-union contractors avoid government work because of the regulatory and prevailing wage requirements, and larger contractors aren't interested in the small projects that make up the bulk of our workload.

Facilities and Procurement have been working together to find ways to overcome the Lab's

challenging competitive position. Part of the answer is expanding the resource base of potential bidders, and this effort, helped by the recent downturn in the Bay Area construction market, has borne fruit. According to Small Projects Group manager Chuck Taberski, "We're getting great responses:

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Facilities Quarterly is available online at
<http://www.lbl.gov/Workplace/Facilities>.

SMART 'DOZER *continued from page 1*

veyor, Faria is able to do the work of a two-man surveying team. As Faria explains, "I can do changes or as-builts while we're working, so you

don't have to put things on hold or order the surveyors to be there at specific times. If I have an operator that accidentally knocks down a

marker, I can replace it without stopping the work."

In addition to grading and paving, the Calvin Road extension includes v-ditches, trash gates and culverts for rainwater, and two underground 8-inch water pipes to supply the future water storage tank. Work on the road is expected to be complete in Spring 2003.

The Sitewide Water Upgrade project will replace Berkeley Lab's most deteriorated water mains, install cathodic protection on the entire system to prevent corrosion, and provide many other system upgrades. To date, new water lines have been installed and put in service for buildings 2, 5, 10, 17, 25A, 27, 47, 50, 53, 54, 58, 70, 70A, and 80.

From the Division Director ...

My first two months at Berkeley Lab have been a period of familiarization—with Facilities, with our service programs, and with Berkeley Lab's administrative and business processes. Most pleasant have been my informal, face-to-face meetings with Facilities staff. I am pleased to have had the opportunity to meet so many members of the Facilities team, learn something about each of you, answer questions, and share my vision for the organization.

Although a Facilities director's responsibilities are complex and diverse, the highest priority is leadership. Managing the Division's assets and resources to deliver world-class service is everyone's responsibility, but leadership begins at the top. That is why I have placed my meetings with staff at the top of my list. For Facilities to be successful, we must all share a common vision of excellence and a common set of ethics, goals and principles. It is my obligation as Division Director to set an example that is consistent with these values and, in so doing, earn your confidence and respect. As we get to know each other better, I look forward to open and honest communications that both keep you informed and give you an opportunity for input. I encourage every Facilities employee to join me in an ongoing dialogue to make this a productive and positive work environment.

As I pledged, I am moving forward to engage the other divisions in developing the strategic partnerships that I believe are essential in making Facilities a greater asset to the scientific mission. Once I am familiar with each division, my objective will be to identify and implement the most effective program of regular communications for reviewing work in progress, debriefing past projects and services, and discussing potential future scientific projects. By giving the divisions more direct access to our technical and planning services at project conception, critical issues such as construction costs, infrastructure impacts, and workload can be factored in at the front end of the planning process. Facilities will then become a stakeholder in projects at a much earlier stage and will take more ownership in their success.

My initial observations of the Laboratory and the Facilities Division have been extremely positive. I feel very much at home here and I look forward to the challenges that lie ahead. I cannot express strongly enough my appreciation for the warm welcome that I have received from the Facilities staff and the Laboratory community. This is certainly a creative and dynamic environment and I am very pleased to be part of the scientific mission.

Facilities is a large, complex and diverse organization. Leading it will require a careful and thoughtful approach that insures we are positioned to meet our mission and address future challenges. I welcome you to join me in working to meet those challenges.

George Reyes

COST FACTOR

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more bidders and more competitive bids—and contractors are hungrier."

The Lab invites prequalified subcontractors to bid on many contracts, increasing participation and ensuring a high level of reliability for even the lowest bidder, although the Lab's policy of "best value pricing" allows selection of a higher bid if this will provide a better return on investment.

Diligence in preparing the bid package, so that all details of the project are clearly presented, is crucial in ensuring accurate bids. For example, provisions for negotiating change orders help control costs on larger projects.

Facilities is now partnering with a number of construction firms and architect/engineers. These ongoing relationships bring the subcontractor into the project at the earliest planning stage, helping lay the groundwork for good project design and efficient execution.

Facilities is currently looking at other ways to package work that makes
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FACILITIES DIVISION

Facilities provides Berkeley Lab with a full range of architectural and engineering, construction, and maintenance services for new facilities and for modification and support of existing facilities.

Architectural and engineering services include facility planning, programming, design, engineering, project management, and construction management. Maintenance and construction functions include custodial, gardening, and lighting services; operation, service, and repair or replacement of equipment and utility systems; and modifications, alterations, and additions to buildings, equipment, facilities, and utilities. Additional services include bus and fleet management,

mail distribution, stores distribution, property management, property disposal, cafeteria operations, and electronics repair.

Ongoing Facilities activities include renewal and upgrade of site utility systems and building equipment; preparation of environmental planning studies; in-house energy management; space planning; and assurance of Laboratory compliance with appropriate facilities-related regulations and with University and DOE policies and procedures.

The Work Request Center expedites facility-related work requests, answers questions, and provides support for facility-related needs.

FOCUS ON SERVICE: Riggers

How do you move something very delicate that's worth \$20 million and weighs 30 tons? You call the Rigging and Hoisting section of Facilities Technical Services. The Riggers specialize in high-value, high-consequence lifts—in this case, moving the front end for DOE's Spallation Neutron Source (SNS) from the Building 71 high bay to a waiting Transportation flat bed truck for shipment to Oak Ridge, Tennessee.

Valued at about \$10 million each, the Medium-Energy Beam Transport (MEBT) and Radio Frequency Quadrupole (RFQ), were designed from the start with an eye to the first 50 feet of their 2500-mile journey. This made preparations for the "pick" relatively easy, since the equipment frames were designed to carry the full weight of the equipment without excessive flexing, a problem that could cause permanent bending of the frame.

In the two weeks prior to the SNS lift in April 2002, Rigging and Hoisting supervisor Kevin Trigales prepared a procedure that covered every detail of the lift. Facilities Structural Engineer Fred Angliss carried out a structural analysis, including load testing, to assess the amount of flex.

Special rigging gear included a 5-ton capacity strongback and a set of four stabilizing chains. Because the main lifting points were below the equipment's center of gravity, the chains were introduced to prevent the load from "rolling."

As with all high-consequence lifts, the procedure had to be approved by the customer, the Mechanical Engineering Department, EH&S, Facilities Structural Engineering, and the Facilities Rigging Supervisor. The payoff was a lift that went according to plan,

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COMPLIMENTS

Planning Group Leader Laura Chen, received a note from Tom Caronna of EH&S praising "the customer service efforts" of Rich McClure, Paul Franke, and Jeff Philliber in helping resolve a shielding block disposal issue.

Dan Girlington cites "fine work" by the Facilities Paint Shop's Joe Cullen and Barry Pope on the Building 88 utility pad and the basement level rest room. According to Girlington, the work was of high quality, was conducted safely, and demonstrated good planning and use of time.

Jeanne Miller of ASD reports her department's "satisfaction with an office customization performed recently by the LBNL Carpenter Shop. It's like a new, bigger office. And, best of all, it's beautiful. Everyone who comes in admires the difference. "We all have the highest regard for the carpenters who designed and created this furniture. They are clearly masters of their craft."

WORK REQUEST CENTER

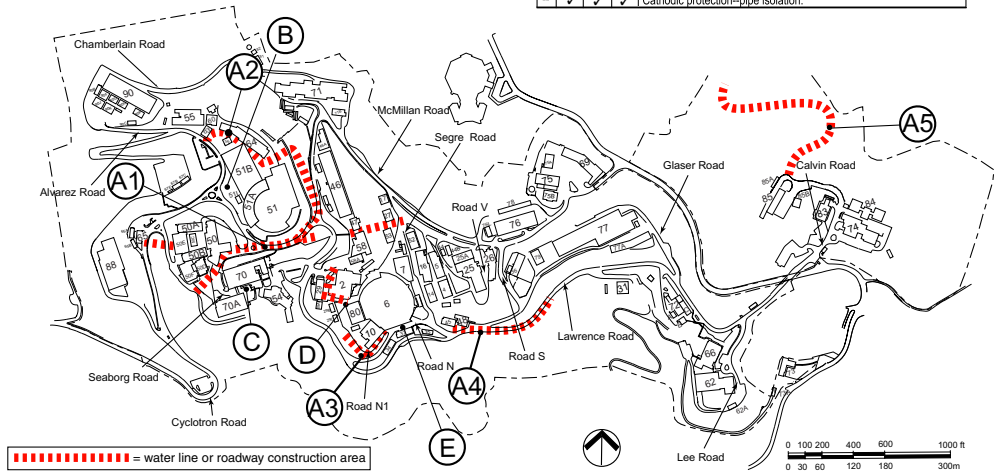
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The WRC welcomes questions or comments about Facilities Quarterly.

CONSTRUCTION AND YOU

Current construction projects affecting parking, or vehicular or pedestrian circulation

	JAN	FEB	MAR	PLANNED WORK
A1	✓			Tie in water line: Lawrence, McMillan Rds, Lot J.
A2	✓	✓		Water line: B51, B64.
A3		✓	✓	Water line: B10.
A4			✓	Water line: B48.
A5	✓	✓	✓	New access road & pipeline: East Canyon
--	✓	✓	✓	Fire sprinkler lines--water service: various bldgs.
--	✓	✓	✓	Isolation valves--water service: various bldgs.
--	✓	✓	✓	Cathodic protection--pipe isolation.



Project Contacts. The name in parentheses after each project is the Project Manager (PM) or other person who is responsible for project oversight: coordinating all phases from design through construction; controlling cost, scope and schedule; and ensuring client satisfaction. This person will be happy to answer any questions about the project.

A Sitewide Water Distribution Upgrade

JAN	FEB	MAR
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This major water supply system upgrade will intermittently affect traffic and pedestrian circulation, parking, and building water service over the next 12 months. (Charles Allen, x6438)

B Bldg 51: Excess Facilities Projects

JAN	FEB	MAR
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The safety fence around portions of Building 51 will remain in place. Although significant truck traffic is not projected, please be aware of heavy equipment or trucks entering or exiting the traffic stream near the traffic circle. (Richard Stanton, x6357)

C Bldg 70A: Wet and Culture Labs

JAN	FEB	MAR
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Parking spaces in the loading dock area between Buildings 70 and 70A will be used as a construction laydown area. (Bill Wu, x5216)

Bldg 6: Sector 4 Support Building

JAN	FEB	MAR
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Construction of an expansion to Bldg 6 will eliminate parking between Bldg 80 and Bldg 10. Parking spaces on the west side of Bldg 10 will be reserved as the contractor's laydown area. (Dan Galvez, 6213)

Bldg 6: South Side Expansion

JAN	FEB	MAR
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Parking spaces on Road N along the south side of Building 6 will be eliminated to make room for a building addition. Road N1 will be closed intermittently. Necessary closure notifications will be posted on the "Today at Berkeley Lab" web page. (Dan Galvez, 6213)

"CAUTION—CONSTRUCTION AREA"

Construction barricades and warnings are there for your protection. Under no circumstances should you cross a construction barricade, or disobey posted warnings or directions. Contact the Project Manager for escorted access to construction areas.

ON THE DRAWING BOARD

projects in study or conceptual design

Building 6: Advanced Light Source User Space

Funding has been requested for FY2003 to provide additional research support space in the ALS. (Dan Galvez, x6213)

Building 77: Rehabilitation of Building Structure and Systems, Phase 2

This project will correct mechanical, electrical and architectural deficiencies in Buildings 77 and 77A. The conceptual design phase is completed. Funding has been requested for FY 2003. (Dan Galvez, x6213)

Research Support Building

Planning is going forward on a new 2,900-sq-meter (26,000 sq ft) building that will house key Berkeley Lab administrative functions now scattered across the site. This "Civic Center" will be located on the site of Building 29, which has been demolished. The new building's central location will allow efficient administration and easy access for all staff and guest researchers. (Richard Stanton, x6221)

IN PROGRESS

funded projects

Bldg 2: Laser Lab

Remodeling of rooms 307, 327, 333, 335, and 359 will accommodate three new laser labs and a pump room. The work includes demolition, relocation and installation of doors and interconnects, furnishing of walls and floors, installation of new overhead frames for equipment and utilities, electrical upgrades, additional LCW piping, casework anchorage of user-supplied laser tables and equipment, mechanical system modification, and revisions to the fire sprinkler system. (Bill Wu, x5216)

Bldg 6: Sector 4 Support Building

Construction is in progress for an equipment staging area for Beamline 4. This 100-sq-m (1,100-sq-ft) single-story addition will be located between buildings 10 and 80. (Dan Galvez, x6213)

Bldg 6: South Side Expansion

A building addition containing hallway and lobby space will provide perimeter access around new beamlines 12.2.2 and 12.3.1. (Dan Galvez, x6213)

Bldg 58A: Building Extension

A two-story extension will be added to Bldg. 58A to accommodate the increased length of AFRD's HCX experiment. (Bill Wu, x5216)

Bldg 64: Addition of Labs and Offices

Funded for FY2003, this project will build out the last high-bay space in Building 64, creating additional laboratories and office spaces. The scope

includes addition of a second floor, a new elevator, rearrangement of exit paths, and removal of an injector from room 64-131. (Bill Wu, x5216)

Bldg 70A: Wet and Culture Labs

Approximately 2700 sq ft (250 sq meters) of shop space will be converted into an Earth Sciences wet lab, (1850 sq ft) and a Life Sciences cell culture laboratory (850 sq ft). (Bill Wu, x5216)

Bldg 943: First Floor Computer Room Buildout

Work consists of 3,000 sq ft (280 sq meters) of buildout to complete the Oakland Scientific Facility's first floor computer room. It includes extension of the seismically-enhanced three-foot raised computer flooring, ceiling systems, computer room HVAC systems, an underfloor chilled water system, network cable tray systems, laser-based smoke detection, underfloor fire sprinklers, connection of utilities, seismic restraint of the computer equipment and support infrastructure. (Dave Tudor, x4171)

Sitewide Water Distribution Upgrade, Phase 1

Much of Berkeley Lab's fresh-water supply system has been in place for over 30 years. This project will replace about 0.9 mile (1.5 km) of cast iron pipe and upgrade the remaining 5 miles (8 km) of pipe, providing corrosion protection, new valves, pressure reducing stations, improvements to existing water storage tanks, and a new water storage tank in the East Canyon area. Construction is in progress. (Charles Allen, x6438)

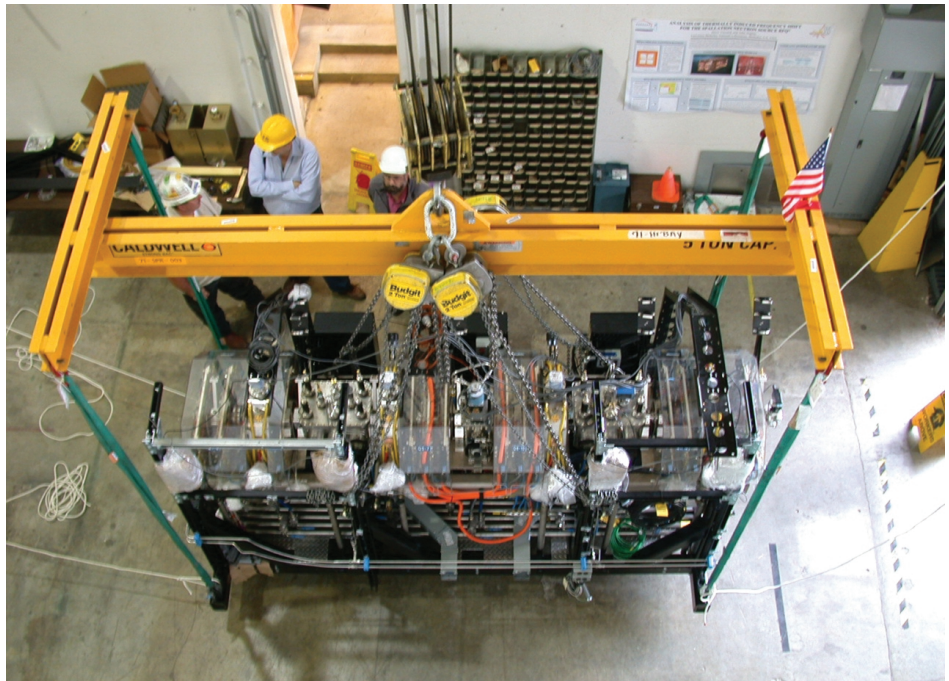
RIGGERS *continued from page 3*

allowing installation of the SNS Front End at Oak Ridge on time and within budget.

High-value, high-consequence lifts are only one of many areas in which the Riggers support research programs, maintenance, and construction. Currently, removing shielding blocks for the Building 51 Decommissioning project is keeping the Riggers busy. Other common assignments include work at the ALS, changing out of rooftop air conditioners, steel erection and other public works, and moving and setting massive optical tables—some two feet thick and 12 feet long.

The riggers' record for sheer weight was the recent removal of the 2,000-ton HISS magnet. Trigales rented a 250-ton crane to do the lifting, having sliced up the magnet into manageable chunks with a plasma cutter.

The riggers—Ron Silva, Malcolm Hawkins, Ray Stevens, Pat Ross, Johnny Rivera, Brad Powell, Scott Jageman, Rory Dunaway, Kevin McPherson, and Frank Armas—take care of cranes and rigging labwide, perform load tests and make sure the brakes work. According to Crane and



Years of work—and about \$10 million—hang in the balance as crane lifts MEBT.

Hoist Office supervisor Steve Wright, this includes about 430 hoists and cranes, ranging in capacity from 100 lb to 60,000 lb.

Most of Berkeley Lab's cranes and hoists are normally operated by researchers, engineers, and technicians who have successfully completed EH&S course EHS 210, Hoist Operator Training. This course qualifies them for "low capacity" lifts up to one ton.

For larger capacity lifts, personnel must take EHS 206 to earn an "incidental" crane operator's license that must be recertified every three years. This allows lifts up to 75 percent of the crane or hoist capacity, excepting high-value, high-consequence lifts. For anything over 75 percent, call the Work Request Center (x6274) to bring in the riggers. For more information on hoist and crane use requirements, see PUB-3000, section 5.4.7.

COST FACTOR

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the best use of subcontractor resources. For example, in job order contracting the subcontractor bids "against pricebook" on an indefinite quantity of work. Basically, the subcontractor and Berkeley Lab would agree on a markup on specific labor and material rates for a wide selection of construction tasks. This would allow the Lab to bundle many small projects together rather than bidding them separately.

There are tradeoffs in any contracting arrangement. According to Taberski, the bottom line is to get contractors on the hill that "...have the right mindset—cost conscious, attentive to detail, flexible, and good to work with. It comes down to working with people you trust."

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